

Chapter Eleven: Contents

(Terms and Acronyms – 01 March 2002 – LA-UR 00-1725 – TRANSIMS3.0)

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Chapter Eleven—Terms and Acronyms

1. TERMS

A

Accessory	The place where something happens along a link.
Activity	Something that a person in a household does; each activity has parameters associated with it including priority, location, starting time, ending time, and duration.
Activity Generator	A TRANSIMS module that generates a list of activities for each member of the synthetic population
Activity Regenerator	A program used to change the existing activity list by partial regeneration of the activities or to generate a new activity list for the entire household.
Activity Location	A place on a link in which traveler activities can take place (such as work, home, and shopping).
Activity Set	
Attributes	Represent information about travelers such as their age, income, gender, or profession.

B

Barrier	A divider such as a curb or grade separation that prevents vehicles from moving between two adjacent lanes on a link.
Binary Node Number	Node number derived recursively as follows; if binary node number k is split into two nodes, the left one is number $2k$, and the right is number $2k+1$.
Block Group	U.S. Census Bureau block group number.
Block Group Locator	Each household in the baseline population is assigned a home location.
Boundary Exchange	Exchange of boundary information between CPUs.

Busway A street restricted to use by buses.

C

Cellular Automata Method of accomplishing simulated vehicle movement in the Traffic Microsimulator.

Census Block Group

Census Tract

Circle Network A sample network that contains merge and turn lanes and is used to calibrate and test the Traffic Microsimulator.

Collector Street A roadway on which vehicular traffic is given preferential right of way, and at the entrances to which vehicular traffic from intersecting roadways is required by law to yield right-of-way to vehicles on such a roadway in obedience to either a stop sign or a yield sign, when such signs are erected.

Constant Size Box Format Data for each box of a given fixed size in the Output Visualizer.

D

Demographics Characteristics of a household or person.

Detector A device that identifies the presence or passage of a vehicle over an area of the lanes on a link; used as the triggers for actuated controllers.

D_p Distance from the intersection where a vehicle starts to consider changing lanes in order to follow its plan.

Diurnal Emissions Evaporative emissions that occur because of the temperature changes that occur during the day.

Dynamic Vehicle Behaviors Acceleration, deceleration, mode transfer, and signal intersection behavior.

E

Edge	A connection between two nodes; each edge has an associated link and a fraction of the link that it represents.
Emissions Estimator	A TRANSIMS module that translates traveler (vehicle) behavior into estimates of air quality, energy consumption, and carbon dioxide emissions.
Evaporative Emissions	Emissions that occur from evaporation of the fuel in vehicles.
Event Data	Data that reports when an interesting event occurs for a traveler; events are recorded as they occur, at irregular travel intervals.
Evolution Data	Data that provides detailed information about how the state of the simulation evolves in time; evolution data may be recorded on every timestep or less frequently, as desired. (also known as snapshot data)
Expectations	Encompasses information in the Selector/Iteration Database such as how long a traveler expects to travel between two activities based on the route between them generated by the Route Planner.
Experiences	Compose information extracted from detailed Traffic Microsimulator output.
Expressway	A divided, arterial highway for through traffic with partial control of access.

F

Family households	Households with two or more related individuals.
Feedback	
Ferry	A waterway crossed by ferry.
Fleet Composition	The number of buses and trucks, including the fractions in various categories that describe engine size, chassis size, and model year.
Fleet Status	Estimate of the vehicle loads as the HDV travels about the city.

Framework

The series of TRANSIMS modules and their file interfaces.

Freeway

A divided, arterial highway for through traffic with full control of access. Full access control means the authority to control access is exercised to give preference to through traffic by providing access connections with selected public roads, but prohibiting grade crossings and/or direct private driveway connections.

Freeway ramp

A unidirectional roadway providing connection between a freeway or expressway and an arterial.

Frontage Road

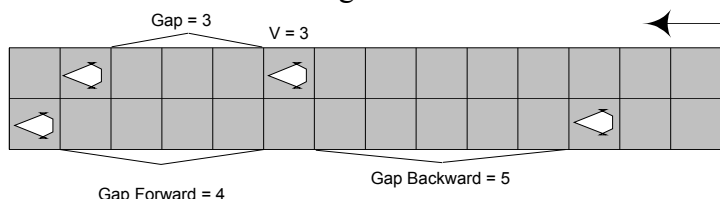
An arterial that runs parallel to a freeway or expressway.

Fuel Evaporation Schedule

Treats emissions associated with resting losses, running losses, hot soaks, and diurnal pressure changes.

G**Gap**

Number of empty cells between this vehicle and the next vehicle on the grid. If this is the first vehicle on the grid, gap is the number of empty cells between this vehicle and the end of the grid.

**Geographic Point**

Contains the coordinates of a position on a map.

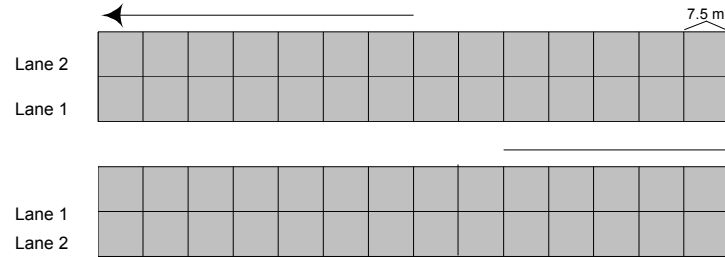
Geographic Rectangle

A rectangle in a map coordinate system.

Grid

Division of the link into cells forming a grid. The Traffic Microsimulator uses a separate grid for each lane on the roadway. Each cell is 7.5 meters long. Vehicles may occupy more than one cell of a grid. In particular, the length of a transit vehicle (in cells) may be set using the configuration file key

CA_BUS_LENGTH.

**Group quarters**

Dwellings such as college dormitories.

H**Hard Accelerations**

Accelerations greater than the accelerations associated with 10% of vehicles that have the largest velocity-acceleration product.

Heavy Rail

A roadbed restricted to use by heavy rail cars.

Heavy-Duty Vehicle Tailpipe Submodule

Treats emissions from trucks and buses.

Hibernating Travelers

Those travelers who have already executed one leg of their plan and are waiting to depart on another.

Home Location

The home location of a household and all persons in the household; this number is the ID of a TRANSIMS activity location and is unique for each TRANSIMS transportation network.

Hot Soak Emissions

Evaporative emissions that occur for an hour after a vehicle has been running and has been turned off.

Household

One or more persons with a common home location.

I

Index	A sorted set of entries together with a list of file names referred to by the entries; it is stored on disk and read into memory.
Index Entry	Contains a pointer to a disk file, a byte offset into the file, and the value of a major and minor key associated with the data record to be found at the given offset in the given file.
Index File	A file that contains a sorted index of one or more data files.
Intersection Snapshot Data	Provides information about a vehicle as it is traversing an intersection.
Iteration	Execution of one TRANSIMS program leg (e.g., Activity Generator, Route Planner, Traffic Microsimulator).
Iteration Database	Contains a summary history of each traveler's attributes, expectations, and experiences during the iterations within a study.
Itinerant Travelers	Those travelers passing through the metropolitan region whose trips originate outside the region.
Iterator	A pointer to an index entry; it is used to iterate through an index in a fixed order.

J**K**

L

Lane	A place where traffic flows on a link. The lanes on each side/direction of the link are numbered separately, starting with lane “number one” as the leftmost lane (relative to the direction of travel). Each successive lane to the right of it is numbered one greater than its predecessor. Pocket lanes (i.e., turn pockets, merges, and pull-outs) are numbered in sequence, even if they do not exist for the full length of the link. If present, a two-way left-turn lane is considered to be lane “number zero.”
Lane Connectivity	<p>Lane connectivity specifies how lanes are connected across a node. Lanes are numbered from the median and include turn pockets. Incoming and outgoing links and lanes are defined relative to the node.</p> <p>For each incoming lane on an incoming link, at least one outgoing lane must be specified for each outgoing link that a vehicle on the incoming link can transition to. If desired, multiple outgoing lanes may be defined for an outgoing link.</p>
Leg	A set of contiguous nodes and links that are traversed with a single travel mode.
Light Rail	A roadbed restricted to use by light rail cars.
Light-Duty Vehicle Tailpipe Submodule	A TRANSIMS submodule that treats tailpipes emissions from cars, small trucks, and sport utility vehicles.
Link	That part of the network corresponding to an edge in graph theory. Links represent street and road segments. Each link has a constant number of permanent lanes but may have a variable number of pocket lanes. A link may have lanes in both directions; alternately, the lanes in opposite directions may be on separate links (in which case no passing into oncoming lanes is possible).
Link Accessories	Have a sense of direction indicating on which side of the link they reside (e.g., parking places and transit stops).
Link Densities Summary Data	Reports counts and velocities within boxes that partition the link.
Link Energy Summary Data	Reports histograms of energies (integrated power) of vehicles accumulated as vehicles enter the links.

Link Travel Times Summary Data	Reports counts of vehicles and travel times on links accumulated as vehicles exit the links.
Link Velocities Summary Data	Reports histograms of velocities of vehicles within boxes that partition the link.
Local Street	A roadway on which vehicular traffic is given preferential right of way, and at the entrances to which vehicular traffic from intersecting roadways is required by law to yield right-of-way to vehicles on such a roadway in obedience to either a stop sign or a yield sign, when such signs are erected.
Local Streets Network	Allows all of the modules of TRANSIMS to be tested.
Location	A lane-specific point along a link.
M	
MABLE/Geocorr	The MABLE/Geocorr geographic correspondence engine generates files and/or reports showing the relationships between a wide variety of geographic coverages for the United States.
Mmapped	Memory mapped; files are mapped directly into memory.
Mode	Mode type of transportation between activities; i.e., car, bus, walk
Mode Choice	Defines the allowed modes of travel and their order; given in the form of a string of characters.
Mode String	A list of travel modes that must be used in the order given along the path from source to destination.
Movement Rule	“Accelerate when you can; slow down if you must; sometimes slow down for no reason.”
Multimode Network	Constructed to test mode choice and a set of feedback selectors; allow the entire TRANSIMS framework to be exercised.

N

Nitrogen-Oxides	Nitric Oxide and Nitrogen Dioxides.
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Node	<p>The part of the network corresponding to a vertex in graph theory. Nodes typically take place at intersections in the road network. A node must be present where the network branches and where the permanent number of lanes changes.</p> <p>A lane is considered permanent if it is not a temporary, pocket lane (see the definition of pocket lane below). However, a node may be present where neither of the aforementioned occurs.</p> <p>Nodes are not required where turn pockets start or end because these are not considered permanent lanes. Each node has a traffic control associated with it (e.g., null, unsignalized, pre-timed, actuated, or coordinated).</p>
Node Number	<p>Sequential node number; determined recursively starting with 1 for the root node and proceeding to the left until a terminal node is reached.</p>
Nonfamily households	<p>Individuals living alone or unrelated individuals living together.</p>
N_{ran}	<p>Random number between 0.0 and 0.</p>
Notational File	<p>The file that would result if the data records referred to by all of the entries in an index were gathered into a single file.</p>
O	
Off-plan Vehicle	<p>A vehicle that is not in an acceptable approach lane when it is ready to enter an intersection; it cannot follow its assigned plan.</p>
Output Visualizer	<p>A TRANSIMS module that allows an analyst to dynamically view the output from the Activity Generator, Route Planner, and Traffic Microsimulator modules; all displays are both temporally and spatially dynamic.</p>

P**Parking Areas**

Located along links, parking areas are used as origins and destinations for vehicle trips. Parking may be placed where it is physically located in the network, or it may be placed in aggregate generic parking areas representing several of the driveways, lots, parking places, etc., on a link. Places where vehicles leave the network are called boundary parking areas.

 P_d

Deceleration probability; probability that a vehicle will decelerate during a timestep.

Person number

A unique identifier carried through the Route Planner to the Traffic Microsimulator.

Phase

A portion of a traffic signal cycle when the allowed movements are unchanged; a phase is composed of intervals where the traffic displays are constant.

Phasing Plan

Specifies the turn protection in effect for transitioning from an incoming link to an outgoing link during a particular phase of a specific timing plan.

 P_L

Lane changing probability; probability that a vehicle will change lanes during a timestep for reasons other than plan following.

Plan

Consists of a sequence of trips.

Pocket

A length of lane intended for special uses such as buses and pulling out, vehicles waiting for turns, vehicles accelerating in order to merge, etc.

Pocket Lanes

A pocket lane is either

- a right- or left-turn pocket (a lane that starts after the “from” node and ends at the “to” node),
- a right or left pull-out (a lane that starts after the “from” node and ends before the “to” node), or
- a right or left merge pocket (a lane that starts at the “from” node and ends before the “to” node).

If a lane starts at the “from” node and ends at the “to” node, it is considered a permanent lane (not a pocket lane).

Population

Persons grouped into households.

Population Synthesizer	A TRANSIMS module that builds virtual households for a given metropolitan area.
Primary Arterial	A major arterial roadway with intersections at grade crossings and direct access to abutting property and on which geometric design and traffic-control measures are used to expedite safe movement of through traffic.
Process Link	A “virtual” connection between an activity location, parking place, or transit stop and another activity location, parking location, or transit stop. It represents the process of changing modes and accounts for the cost (in time and money) of making a mode change.
PUMS Household ID	The PUMS household ID number from which the synthetic population was derived.
Q	
R	
Regression tree	A technique for modeling a regression relationship between a dependent variable Y and independent variables X_1, X_2, \dots, X_p .
Resting Losses	Evaporative emissions resulting from fuel migrating through plastic hoses, gas tanks, and fittings.
Right Node Number	Sequential node number for the right node of split; coded 0 for terminal node.
Route	<p>A transit route consists of a sequential set of transit stops visited by a transit vehicle. Each route is assigned an integer ID. No transit route may include the same transit stop more than once.</p> <p>For example, the “inbound” and “outbound” portions of a round trip must be assigned different route IDs. In addition, two transit vehicles that follow the same path through the network but stop at different places along the path (for example, an express and local train) must have different route IDs</p>

Route Planner	A TRANSIMS module that develops travel plans based on the demand represented in the activities data file.
Running Loss Emission	Evaporative emissions that occur when a vehicle is operating.
S	
Secondary Arterial	A minor arterial roadway with intersections at grade crossings and direct access to abutting property and on which geometric design and traffic-control measures are used to expedite safe movement of through traffic.
Selector	A TRANSIMS component that controls the flow of information among the TRANSIMS modules.
Selector Choices	Files that list the travelers who will be reassigned activities, replanned, resimulated, etc.
Selector Statistics	Statistics that provide a basic summary of the choices the Selector makes.
Signal Coordinator	A device that controls the operation of one or more traffic controls; it uses a coordination algorithm to coordinate the work of several traffic controls using detector input.
Signalized Node	Represents a traffic light; each signal must have a timing plan and a phasing plan.
Simplified Activity Generator	Produces activities for the Multimode Network.
Simplified Population Generator	Produces populations and activities for the small Multimode Network.
Snapshot Data	Traffic animation can be produced from the snapshot files, which contain time, position, and velocity information for each vehicle in simulation. (see Evolution Data)
Soak Time	The length of time an engine has been off before the current trip began.
Split Value	Value used along with the split variable to create children nodes; coded 0 for terminal node.
Street layer	All links between intersections, with added parking locations.

Study/Buffer Areas	<p>The microsimulation distinguishes two types of links in its calculations: Study area links are the links of interest for the traffic analyst. For example, the output subsystem records events such as when a vehicle leaves or enters the study area.</p> <p>The nature of the microsimulation makes it necessary to simulate traffic on additional buffer area links. Typically, these links form a fringe about two links thick around the study area. A simulation includes buffer links in order to avoid edge effects, such as when vehicles enter the study area on its boundary. The buffer gives these vehicles time to interact with other traffic and achieve realistic behavior before entering the study area.</p>
Summary Data	<p>Reports aggregate data about the simulation; summary data is sampled, accumulated, and reported periodically throughout the simulation.</p>
Summary Data Output	<p>(includes both spatial and temporal) Spatial summaries include data aggregated over user-defined sections of roadway defined along the street networks; temporal summaries include data about travel times along streets at various times of day.</p>
Synthetic Households	<p>Classified as family, non-family, or individuals living in group quarters such as dorms.</p>
T	
Tailpipe Emissions	<p>Emissions data produced by the Emissions Estimator and Emissions Estimator HDV submodule.</p>
Tee Network	<p>A sample network used to study lane changing behavior and plan following.</p>
Timestep	<p>One microsimulation update cycle in which all movement and lane changes are executed for each vehicle; each timestep typically represents approximately one second of simulation time.</p>
Timing Plan	<p>Specifies the lengths of the intervals (minimum green, maximum green, green extension, yellow, and red clearances times) during the specific phases for a traffic light. Many nodes may have the same timing plan. It is possible for each phase to transition to more than one phase (if required).</p>

Tract	U.S. Census Bureau tract number
Traffic Control	Each node has traffic control associated with it. The traffic control specifies how lanes are connected across the node and the type of sign or signalized control that determines who has the right-of-way.
Traffic Microsimulator	A TRANSIMS module that executes individuals' travel plans, link-by-link, as provided by the Route Planner, at the start time specified by the plan.
TRANSIMS ID	Unique number assigned to each household and person; must be greater than zero.
Transit	<p>Vehicles that</p> <ul style="list-style-type: none">• travel on pre-specified routes,• stop at specified accessory locations listed in the Transit Stop network data table, and• attempt to follow a predetermined schedule. <p>Examples include buses and light-rail cars.</p>
Transit Schedule	Each route has a schedule that gives the times a transit vehicle visits each stop along the route.
Transit Stop	A location on a link in which a transit vehicle (such as a bus or light rail car) waits to embark and disembark passengers. Transit stops have a style (station, stop, or yard), and vehicle capacity and vehicle type restrictions.
Transit Vehicle	Any vehicle that makes scheduled stops along a predetermined route, such as buses, trains, and streetcars; a taxi would not be considered a transit vehicle.
Transit Zone	Each stop may have a transit zone associated with it. These zones enable the determination of zone-to-zone travel costs.
Traveler Event Data	Almost anything that happens to a traveler can be reported as a time-stamped event (e.g., begin/end waiting time at a given location, such as a bus stop).
Traveler Plan	The set of trips that carries the traveler through his/her desired activities.
Trip	A set of contiguous legs.

Trip Request	Contains information about a traveler's activities, including the origin and destination of a trip, the preferred starting time, and the mode choice.
Trip Table Activity Generator	Produces activities from the entries in a trip table, which contains information about the number of trips between zones.
U	
Unsignalized Node	Represents the type of sign control, if any, that is present at an unsignalized node. Examples are stop and yield signs. Nodes where only the number of permanent lanes is changing are generally considered unsignalized.
V	
V	Speed of the vehicle in cells/timestep
Variable	Demographic variable for splitting a node into two children nodes; coded 0 for terminal node.
Variable Size Box Format	A box of any size and location on a given link.
Vehicle Evolution Format	Data on vehicle position, type, passengers, and velocity
Vehicle Flux	The product of the density of vehicles by their speeds.
Vehicle Generator	Creates a TRANSIMS vehicle file that contains an entry for each vehicle in a household.
Vehicle Snapshot Data	Provides information about vehicles traveling on a link.
Vehicle Type	Vehicles can be classified in several ways: by network type (e.g., definitions used in imposing lane use or turn prohibition restrictions); by usage (e.g., transit, private auto, carpool, jitney), which affects simulation; by performance characteristics (e.g., length, acceleration profile); by emissions type (e.g., power/weight ratio.
$V_{GlobalMax}$	Maximum speed on any link in cells/timestep.
V_{Ma}	Speed limit on the link in cells/timestep.

W**Walk Layer**

All streets that can be walked along; contains activity locations.

Walkway

A street restricted to use by pedestrians.

Zonal Connector

An imaginary (non-physical) connection to or from the centroid of a traffic analysis zone.

X**y****Z**

2. ACRONYMS

CA	Cellular Automata
CART	Classification and Regression Trees
CBD	Central Business District
CPN	Computational Node
CIESIN	Center for International Earth Science Information Network
CMEM	Comprehensive Modal Emission Model
CPU	Central Processing Unit
EPA	Environmental Protection Agency
GCF	Generalized cost function
Geocorr	Geographic Correspondence Engine
HDV	Heavy-Duty Vehicle
HOV	High Occupancy Vehicle
ID	IDentification
IPF	Iterative proportional fitting
ITS	Intelligent Transportation System
LDV	Light-Duty Vehicle
MABLE	Master Area Block Level Equivalency
MPI	Message Passing Interface
MPO	Metropolitan Planning Organization
NHTSA	National Highway Traffic Safety Administration
NFS	Network File System
NTSC	National Television Standards Committee
PAL	Phase Alternating Line
PTL	Preceding Transportation Leg
PUMA	Public Use Microdata Area
PUMS	U.S. Census Bureau Public Use Microdata Samples

PVM	Parallel Virtual Machine
RVP	Reed Vapor Pressure
STF-3A	Summary Tape File 3A
SI	International System of Units
TAZ	Traffic Analysis Zone
TRANSIMS	TRansportation ANaylsis SIMulation System
UAZ	User Analysis Zone
UTM	Universal Transverse Mercator